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Training Programs in Research into the Effectiveness of Teacher Behavior

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ABSTRACT *This article contends that studies into the effectiveness of teacher behavior should give more attention both to a systematic design of training programs as well as to the collection of implementation data concerning teacher behavior, before incorporating the training program into an experimental design.*

INTRODUCTION

Research aimed at increasing knowledge of teaching and learning improving their quality has changed its focus in the course of time. Research has focused on the personal characteristics of teachers, on leadership styles, on teaching methods and on the consequences of implementing different curricula (Evertson & Smylie, 1987).

In the late 1960s studies began to be published relating teacher behavior and student achievement. These studies were aimed at optimizing teaching and learning through teacher action and the assumption that empirically supported insight concerning the relationship between teacher behavior and students' result would contribute to a positive influence on student achievement. We agree with Gage (1978), among others, that knowledge concerning this relationship is essential, not only to directly influence the behavior of practicing teachers, but to use in the education of teachers as well. Such research is part of the process-product research paradigm, in which research activities concentrate largely on the behavior of the teacher. As a rule, studies attempting to determine the causal relationship between teacher behavior and student achievement involve a great many teachers and classrooms.

By and large, studies into the effectiveness of teacher behavior make use of two approaches (Van der Sijde & Tomic, 1989). According to the first approach, teachers learn to use particular teaching behaviors effectively. In this context, 'effective' means that teachers can apply the teaching behaviors they have learned (teacher competence). In other words, the emphasis is on the teacher. This approach has been the foundation of many courses and training programs, for example in the areas of microteaching (Allen & Ryan, 1969) or in-service training (Veenman, Lem & Roelofs, 1990). In the second approach, the adjective 'effective' does not describe

teachers so much as the effects of their teaching (teacher effectiveness). In the first approach, the object of research is to investigate whether, and to what degree, the teacher can implement given activities; in the second, research is geared toward determining whether and to what degree the teacher's teaching behavior produces the desired student learning outcomes. When researchers study the influence of a specific group of teaching behaviors on student learning outcomes, in other words when they investigate the effectiveness of teacher behavior, then they should have some certainty about whether teachers are able to apply the behaviors they have learned and whether they in fact do apply them (teacher competence).

This article emphasizes the importance of a systematic approach to designing course and training programs. The design and realization of training programs should approximate the features of a systematic approach method. Moreover, in researching the effectiveness of teacher behavior, it is important that the research design allows investigators to first study teacher competence and thereafter teacher effectiveness.

In the next section of this article we will describe, first of all, the status of training programs in research into the effectiveness of teacher behavior. Next we describe the minimum number of phases or stages in the design process that we believe one should go through in developing training programs. Finally, in the section discussing the characteristics of training programs in experiments into effective teacher behavior, we deal with three issues in succession: the sources upon which the programs are based, the application or lack thereof of a systematic work method in putting together training programs, and the nature of the implementation data that has been collected about the training program.

THE STATUS OF TRAINING PROGRAMS IN RESEARCH INTO THE EFFECTIVENESS OF TEACHER BEHAVIOR

Improving student learning outcomes through the teacher implies a causal link between teacher behavior (to be changed) and how students score on a test. In other words, the desired change in learning outcomes is a function of changes in teacher behavior. The usual method used to determine a causal relationship is to conduct an experiment using a research design in which the independent variable is manipulated and the value of the dependent variable is subsequently determined. By using an appropriate experimental design we can infer that the value of the dependent variable will differ according to the value of the independent variable. If we can control other sources of variation in the dependent variable other than the independent variable, then we may conclude that the independent variable has produced a change in the dependent variable (Gage & Needels, 1989). In order to control those other variables in research into the effectiveness of teacher behavior, teachers and their classes should be assigned randomly to the experimental and the control groups. The design of experiments into the effectiveness of teacher behavior is roughly the same as a pretest-posttest design (Campbell & Stanley, 1963). Prior to the training period, a systematic observation instrument is used to determine the entering behavior of the teacher. This is known as the pretest. Next the teachers

participate in training sessions for a certain period of time, which is given either in written form, orally, or in a combination of the two. After the training activities have ended, teacher behavior is once again determined using the same observation instrument used in the pretest. The difference between the results observed in pretest and posttest teacher behaviors indicates the effect ascribable to the influence of training.

It is of course standard practice to compare the results of the group of teachers who have gone through the training program with the results of those who have not, the pretest–posttest control group design (Campbell & Stanley, 1963), in order to determine whether the desired teacher behaviors were acquired in some other fashion during the training period.

The results of such training programs are obtained by statistical analysis. However, statistically significant outcomes that might be ascribed to training programs are not necessarily relevant (Molenaar, 1974). More important than significance is whether the results are interesting (Vroon, 1984). Besides statistical values, then, criteria with respect to content are necessary to estimate the value of the training results. A common standard used to determine the effects of training on the behavior of teachers is the 'near-near' transfer (Brainerd, 1977), in which the behaviors to be observed are identical to the behaviors taught during the training period. From the preceding it becomes clear that the training program is of primary importance in research into the effectiveness of teacher behavior, because it incorporates the behaviors to be manipulated and assumed to influence the desired student learning outcomes.

There is a certain amount of agreement concerning the requirements that the design of such experiments must meet. This agreement does not extend, however, to the requirements set for the training program itself before it is given to the experimental group of teachers.

A MINIMAL STRATEGY FOR THE SYSTEMATIC DESIGN OF TRAINING PROGRAMS

Before a training program for a particular field can be set up, a number of activities need to be performed (Van de Wolde, 1990). First, an outline should be made of what is known in that particular field. In order to set up a training program for teachers to produce desireable student learning outcomes, we must make an inventory of published research results relevant to the design of a teacher training program. This takes place in the pilot study phase of this systematic work method.

Also in this phase, we describe the problem in terms of a discrepancy between the actual and the desired behaviors to be manipulated in the training program and analyze the context of the problem. The description of the problem and the context analysis give us the provisional criteria that every potential solution must satisfy. The object of the training program as well as the knowledge available in the field serve as guidelines for a possible training program proposal. This proposal is the training program's design.

In the design phase a number of activities occur in sequence. The description

of the problem serves as the point of departure for the realization of the chosen solution. With this aim in mind, both knowledge acquired in research and knowledge gained in practice are utilized. Important activities in this phase include generating alternative solutions and comparing and contrasting these alternatives. These activities should result in the choice of the best design, given the existing circumstances. The design phase activities end in a work document that establishes clear guidelines for the construction of a prototype training program. The importance of this phase lies in the articulation of the training program's or course's objectives and theoretical points of departure. These objectives and theoretical points of departure are only of secondary importance in the training material such as syllabuses, computer programs and video programs, since the target group is not necessarily interested in the scholarly and theoretical rationale underlying the training program. Fellow researchers and designers, however, are interested, not only in the product, but to an equal degree in the rationale behind the design.

The components of the training program are developed on the basis of the solution's design or blueprint. Unavoidably, an interaction will take place between the blueprint of the solution and its realization. It is not unlikely that problems will arise in the realization phase leading to changes and adaptations. The prototype or end product of the realization phase must be tested in practice. This is only possible by letting the target group try out the actual training program and by subjecting it to subsequent evaluation. In other words, in this phase the solution being proposed must be tested and evaluated in the same context for which it has been designed, with an eye to determine whether the solution is adequate or whether it needs improvement. This evaluation is of a formative nature.

In reality, two separate, distinct evaluation studies should be performed. The first is concerned with whether and to what degree the target group, the teachers, display the desired behaviors of the training program (teacher competence). The second is conducted whenever the training program has been designed for a specific purpose, namely raising student scores in the cognitive or the affective domain by means of changes in teacher behaviors through training (teacher effectiveness). This evaluation should be conducted by means of an experimental design. Only when both evaluation studies show positive results should the training program be administered to the target group. These activities usually take place in the implementation phase of the systematic work method mentioned above.

It goes without saying that design strategies may include a greater number of phases, or that the phases may contain a greater number of activities (Andrews & Goodson, 1980), but a design strategy should at the very least consist of the phases described above.

CHARACTERISTICS OF TRAINING PROGRAMS IN EXPERIMENTS INTO THE EFFECTIVENESS OF TEACHER BEHAVIOR

Gage & Needels (1989) have outlined studies in which training programs were developed for experimental groups of teachers. Out of hundreds of publications, they selected 13 studies on the basis of eight criteria and described the sources used

in these studies to develop the training programs and the implementation data collected. In our investigation we are of course interested in these two questions.

As the presence of the eight criteria increases the probability that the research results will have external validity, we will give these criteria here for the sake of completeness. Teachers with regular full-time appointments participated in the work which focused on the regular curriculum. The investigation took place over a real school period, such as a year or a semester. The teachers were generally assigned at random to experimental and control groups. The independent variables included in the training program were largely derived from the results of previous correlational studies. The teachers were observed and data collected concerning the teacher behaviors. Finally, data concerning the student outcomes were collected.

Many researchers borrow their independent variables or teacher behaviors for the training program from the results of correlational research. In the training programs of two studies, the results of correlational research were filled in with results based on observations of relatively effective and ineffective teachers (Good & Grouws, 1979; Good & Grouws, 1981). Some researchers also drew on theories concerning how children function at school (Anderson *et al.*, 1979; Djalil, 1984; Emmer *et al.*, 1982; Gall *et al.*, 1984; Stallings *et al.*, 1979).

Inspection of these studies reveals that the independent variables, that is, the teacher behaviors to be manipulated and thought to produce the desired student learning outcomes, are derived largely from the outcomes of previous correlational research into process-product relationships. In their research reports, the researchers fail to reflect the reasoning process underlying the independent variables chosen.

Neither do they mention the method used to develop the training program. The most obvious question, to what extent a systematic design strategy was applied in putting together the training program and what that strategy is, is left unanswered, let alone treated systematically. As a result, Gage & Needels' outline (1989), which describes 12 features of the 13 experiments discussed, gives us no information about the way the training programs were put together. Nor do Gage and Needels discuss this omission in their outline of the experiments described.

The systematic design of a training program is, however, of primary importance as is experimental design. This is equally true of implementation data concerning teacher behaviors in the program, which should be collected before the program is included in the experimental design.

In the introductory section we reported two recognizeable approaches in research into the effectiveness of teacher behavior. In the first approach the focus is on whether and to what degree the teacher can apply the behaviors he or she has acquired. In the second approach the pivotal question is whether and to what degree the teaching behaviors of the teacher produce the desired student learning outcomes.

In all 13 experiments implementation data had been collected. The degree of implementation was determined by estimating the differences between teacher behaviors in the experimental group and teacher behaviors in the control group. No single study investigated prior to the experiment whether a group of teachers were able to apply the behaviors desired by the researchers. In other words, we only learn whether teachers were able to implement these behaviors after the experiment had

been conducted. That means that an important characteristic of the training program does not emerge until later. The value of the training program, however, should be known before the program is offered as an experimental condition. An example of a research design that first determines the value of the training program before offering it to the experimental teacher group is to be found in Van der Sijde (1987). In this study, it was first determined whether a group of teachers could in fact apply the behaviors of the training program. Once this had been established, the training program was included in the experimental condition.

DISCUSSION

We stated earlier that training programs included in research into the effectiveness of teacher behavior are largely constructed to produce desirable student learning outcomes. These studies generally fail to include information about the way the training programs had been developed. Upon closer inspection it seems that the studies fail to utilize a systematic design strategy. This deficiency is keenly felt by other researchers, as they are naturally interested not only in the outcome but to an equal degree in the rationale and the different activities leading to it. If agreement prevailed concerning the need for a minimal design strategy in developing teacher training programs, the process of developing training programs would be more verifiable and replicable.

It appears from studies incorporating training programs into the experimental design that the implementation of teacher behaviors is viewed in a particular light. In these studies, implementation seems to be the difference between the behaviors exhibited by the teachers in the experimental group and those exhibited by the teachers in the control group. In other words, the degree of implementation is determined only after measuring the effect of the teacher behaviors on student learning outcomes. In this article, apart from the degree of implementation of teacher behaviors determined by means of an experimental design, we have advocated the collection of still other implementation data. We hope to have argued convincingly that, prior to the experimental design, it should be known whether and to what degree teachers can carry out or implement the behaviors to be manipulated: it might be that teachers are unable to complete or carry out the behaviors desired by the researchers. If it appears that not all the relevant behaviors can be carried out by the teachers, then the training program must be revised. The studies cited above make no mention of this.

In conclusion, we argue that the value of teacher training programs would increase if researchers used a minimal systematic design strategy, which would not only determine the degree to which the teacher behaviors of the program were implemented by means of an experimental design, but would do this before the training program became part of the experimental design.

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